

WHAT IS CLAIMED IS:

1 1. A method of treating and breaking down tight emulsions, comprising:
2 injecting the emulsion with an oxidizing/reducing agent;
3 changing the temperature of the emulsion;
4 allowing interfacial separation of the emulsion;
5 outputting a saleable product phase, a solid phase and an aqueous phase.

1 2. The method of claim 1, further including testing the emulsion prior to the
2 injection to determine the quantity of the oxidizing/reducing agent, treatment time and
3 treatment temperature.

1 3. The method of claim 2, wherein allowing interfacial separation includes
2 maintaining the changed temperature of the emulsion for the determined treatment time.

1 4. The method of claim 1, wherein the injection and the temperature change cause
2 a reduction in interfacial tension and chain scission.

1 5. The method of claim 1, further including injecting a solubilizer into the
2 emulsion after breakage to enhance the saleable product phase and solid phase.

1 6. The method of claim 1, wherein the tight emulsion is slops produced during an
2 industrial process, the extraction of petroleum/petrochemicals and by-products of the
3 production process treatment.

1 7. The method of claim 6, wherein the saleable product phase is oil with enhanced
2 API gravity and significant reduction in base sediments and water, the solid phase is sand
3 and/or base sediments, and the aqueous phase is water with significant reductions in
4 dissolved solids.

1 8. The method of claim 1, wherein the oxidizing/reducing agent includes
2 hydrophobic chemicals, hydrophilic chemicals or a combination thereof.

1 9. The method of claim 7, further including recycling the solid phase into the
2 environment.

1 10. The method of claim 7, wherein the oxidizing/reducing agent is absorbed into
2 the emulsion and strips the oil molecules off the sand and water, and further wherein the
3 oxidizing/reducing agent becomes part of the aqueous phase.

1 11. The method of claim 1, wherein the aqueous phase has a significant reduction in
2 biological oxygen demand and chemical oxygen demand levels.

1 12. The method of claim 1, wherein the aqueous phase is further treated using an
2 oxidizing/reducing agent and a temperature change to convert soluble material to an
3 insoluble state and precipitate dissolved solids, and then the dissolved solids are extracted,
4 thereby leaving a residue and a clean effluent.

1 13. The method of claim 12, wherein the clean effluent is water that complies with
2 international environmental effluent discharge substance parameters.

1 14. The method of claim 12, wherein the residue is recycled into the environment
2 thereby closing the environmental loop.

1 15. A method of treating an effluent, comprising:
2 injecting the effluent with an oxidizing/reducing agent;
3 changing the temperature of the effluent;
4 converting soluble material to an insoluble state and precipitating the dissolved solids;
5 removing the dissolved solids from the effluent, thereby leaving a residue and a clean
6 effluent.

1 16. The method of claim 15, further including testing the effluent prior to the
2 injection to determine the quantity of the oxidizing/reducing agent, treatment time and
3 treatment temperature.

1 17. The method of claim 15, wherein the injection and the temperature change
2 cause a chemical reaction and/or chain scission which promotes removal of the dissolved
3 solids.

1 18. The method of claim 15, wherein the clean effluent is water that complies with
2 international environmental effluent discharge substance parameters.

1 19. The method of claim 15, wherein the residue is recycled into the environment
2 thereby closing the environmental loop.

1 20. The method of claim 19, further including using the residue in the construction
2 industry.